

Section C - Descriptions and Specifications

STATEMENT OF WORK

1. The supply contract resulting from this solicitation shall be for the machining, assembling and testing, and refurbishing / restoring of Main Propulsion Gas Turbine and Ship Systems Gas Turbine Generator systems/components, as well as various Naval Surface Craft's Hull, Mechanical and Electrical (HM&E) systems / components. Work will be for equipment modification or repair, refurbishment, assembly and testing.

a. As specified under authorized delivery orders issued by the Naval Surface Warfare Center, Carderock Division (NSWCCD) Ordering Officer, the Contractor shall: modify repair, refurbish assemble and test the various Government Furnished Material specified under the Section entitled "Supplies/Services".

b. The contractor shall provide machining/services on a variety of equipments and components (e.g. Free Standing Electronic Enclosure Doors, Variable Stator Vane Control Arms, Power Lever Angle Actuators and Module Door Assemblies for the LM2500 Main Propulsion Gas Turbine, Speed and Temperature Control Assemblies and Fuel Nozzle Air Assist Control Panels, Model 139 Local Operating Control Panels and Model 9130 Local Operating Control Panels for the Allison Gas Turbine Generator Sets as well as RPM/Pitch Indicator Units).

c. The contractor shall provide refurbishment / restoration, assembling and/or testing services of various main propulsion and ship service systems. Typical examples of systems to be assembled and tested include: Model 139 and Model 9130 Control Panels, Variable Stator Vane Control Arms, Fuel Nozzle Air Assist Panels, Turbine Temperature and Speed Control Units, LM2500 Module Doors, Power Lever Angle Actuators, RPM / Pitch Indicator Units and Free Standing Electronic Enclosure Doors.

d. Further examples of the equipment to be machined, refurbished / restored, assembled and tested are provided under the following specifications:

1) LM2500 Ancillary Equipment Change (AYC) No. 30, Revision 1, dated 08 October 2003. Parts I (FFG-7 Modification) and III (DD-963 Modification) Installation of Cooling Fans for Free Standing Electronic Enclosures (FSEE) on FFG-7 and DD-963 Class Ships

2) Technical Manual S9234-AB-MMD-020/LM2500 dated 30 June 1999. Paragraphs 8.181 through 8.188. Variable Stator Vane Actuation Beam Bearing Replacement

3) Technical Manual S9234-BD-MMD-030/Model 104 GTGS dated 30 September 1997. Chapter 56. Turbine Temperature and Speed Control Unit

4) Fuel Nozzle Air Assist Panel, Panel Tags, K34 Air Assist (DWG 7625445), Panel Assembly, K34 Air Assist (DWG 7556597), Control Box Assembly, Air Assist (DWG 7556599), Control Box Schematic, Air Assist (DWG 7556608)

5) Technical Manual S9234-AD-MMO-060/LM2500 dated 26 May 2000. Paragraph 7.288. Repair of Access Door Interior Panels, Structure, Hinges, and Provision of Door Hinge Lubrication

6) Technical Manual Henschel Book ID. 1275 dated August 1999. Operation, Troubleshooting, Maintenance and Installation Instructions for Henschel Revolutions Per Minute (RPM)/Pitch Indicator

7) Technical Manual S9234-AB-MMD-050/LM2500 dated 30 June 1999. Chapter 46. Power Lever Angle Actuator Overhaul and Repair

8) Model 139 LOCOP (DWG D-139-A1-11A), (DWG D-139-A1-11B) and (DWG D-139-A1-11C)

9) Model 9130 LOCOP Drawings:

D-9130 A2	D-9130 A13
D-9130 A4	D-9130 EMI
D-9130 A5A1	D-9130 J1-J11
D-9130 A5A2	D-9130 LDOOR
D-9130 A5A3	D-9130 POWERDIST
D-9130 A6A1	D-9130 RDOOR
D-9130 A10	D-9130 SEQ
D-9130 A11	D-9130 TB

e. Each Delivery Order issued under this contract shall specify the Government's requirements and shall contain engineering drawings, detailed sketches, technical repair standards, assembly and test instructions, and detailed specification requirements in conjunction with the statements of work cited in support of the tasking efforts of paragraphs 1.b and 1.c above. All technical data provided under Lots I through V shall be in accordance with the DD Form 1423.

f. The following machining, equipment and facilities capability must be available for use within the contractor's site to provide the services required under this contract:

- 1) Drill Press
- 2) Milling Machine
- 3) Grinder
- 4) Vertical Boring Mill
- 5) Ream
- 6) Material Handling Equipment
- 7) Welding Equipment (solder, brazing, tig/mig)
- 8) Precise Measurement Tools
- 9) Hydraulic Press
- 10) Items for Testing Turbine Temperature and Speed Control Unit
 - a) Temperature Simulator
 - b) Signal Generator
 - c) Frequency Counter
- 11) Items for Testing Power Lever Angle (PLA) Actuator
 - a) Rig Pin, GE Part No. 1C6744P04
 - b) Storage Oscilloscope
 - c) Load/Speed Test Fixture, part no. NT1062
 - d) Potentiometer Setting/Backlash Test Fixture, part no. NT1063
 - e) Test Panel Encoder Display, part no. NT1068
- 12) Items for Testing Model 139 and 9130 LOCOPs
 - a) Engine Simulator Tester for Model 139
 - b) Engine Simulator Tester for Model 9130

A Technical Evaluation Team will visit the contractor's workplace prior to award to visually inspect the required equipment.

2. Examples of the Government's requirements under this contract include:

a. Install a dual cooling fan package on the FSEE rear door to provide cooling air circulation. Using ¼ inch diameter end mill, mill out the lower door louvers to accommodate the fan box (nominally 16-7/8" long by 6-7/8" wide). Place fan enclosure into the cutout and drill 10 holes through the FSEE door using fan housing flange holes as guides. Fasten fan box in place. Apply power to cooling fan unit on modified FSEE rear door to ensure fan rotation. Package unit and return to NSWCCD Philadelphia.

b. Replace actuation lever arm spherical bearings with slot loaded bearings. Remove spherical bearings using hydraulic press and 1C7126 tooling. Restrain lever arm surface flat within 0.0002 inch. Machine bore until slot loaded bearing just slip fits into lever arm using finger pressure only. Chamfer both sides of the diameter (0.020-0.030/45 deg). Inspect for burrs or sharp edges. Visually inspect diameter for cracks using 10x magnifying glass. If suspect areas are found, fluorescent penetrant inspect. No cracks are allowed. Trial assemble a slot loaded bearing. Bearing should just slip fit into bore using finger pressure only. Package unit and return to NSWCCD Philadelphia.

c. Disassemble, clean, inspect and repair Turbine Temperature and Speed Control Unit (TTSCU). Remove cover screw safety wire. Remove cover retainer screws, flat washers, lock washers, cover and gasket. Remove upper and lower circuit cards with attached cannon connectors and fuse. Clean TTSCU inner and outer metal surfaces with a solvent dampened cloth. Clean both circuit boards with an electrical cleaning solvent. Visually inspect electrical receptacles and connector pins for looseness. Visually inspect circuit boards and components for signs of overheating. Replace two resistors as per instruction and redesignate the control assembly part number. Replace any circuit board components by unsoldering and resoldering (in accordance with MIL-HDBK-454) connection wires with a low-power soldering iron and long nosed pliers. Reassemble the TTSCU per instructions and test. Package unit and return to NSWCCD Philadelphia.

d. Assemble and Tag Air Assist Panel. Mount Headline Filter Housing, Regulator Valve Assembly, McDaniels Pressure Gage, Control Box Assembly, Instrument Gage Valves, fitting and tubing to metal panel per NAVSEA drawing 7556597. Fabricate panel tags and mount per NAVSEA drawing 7625445. Test panel assembly as per NAVSEA drawing 7556597. Package and ship to NSWCCD Philadelphia.

e. Repair LM2500 Base Enclosure Access Doors. Remove door hinge pin spring clips then use a flat punch to remove the hinge pins. Using a 1/16-inch diameter punch, remove the four door dog pins. Pull out the door dogs and handles from the door. Grind off the welds attaching the door dog guide blocks to the interior door panels. Patch rusted areas or sections of channel. Cut new door interior panels from stainless steel sheet. Deeply pitted or perforated in spots sections of structural channel shall be repaired by fillet welding doublers to the channel. Manufacture new door hinges and pins if necessary. Package and ship to NSWCCD Philadelphia.

f. Repair Revolutions per Minute (RPM)/Pitch Indicator. Remove the cover subassembly. Remove the synchro digital printed circuit boards A1 or A2 or both if required and replace with new. Remove the display printed circuit board, A3 if necessary and replace with new. Inspect and replace dimmer control potentiometer if necessary. Inspect and replace the lamp test switch if necessary. Inspect and replace the power supply if necessary. Inspect and replace the EMI filter if necessary. Reassemble the RPM/Pitch Indicator. Apply 115VAC, 60 Hz input power to test. Package and ship to NSWCCD Philadelphia.

g. Disassemble, clean, inspect, repair, assemble and test the Power Lever Angle (PLA) Actuator. Perform arm crank alignment and rig position test. Test PLA Actuator to determine failure modes. Failure analysis can be determined by using Table 46-3 in the instructions. Inspect all parts visually for corrosion and damage (cracks, excessive wear, deformities and physical damage) to determine serviceability and reparability. Clean parts using approved cleaning solvent. Wipe parts dry with a lint-free cloth and ambient dry air. One hundred percent replacement of Potentiometer Assembly and Tachometer Assembly is required on all PLA Actuators processed for

repair. One hundred percent replacement of bearings (6, 38B, 38H, 40, 41, 45 and 46) is required on all PLA Actuators processed for repair. Reassemble per paragraph 46.17 prior to testing. Test per paragraph 46.30. Final assembly is accomplished per paragraph 46.19 following acceptance testing. Package and ship to NSWCCD Philadelphia.

h. Refurbish Model 139 Local Operating Control Panel (LOCOP). Record wire tag information from original wiring. Remove original wiring. Manufacture wire tags for each end of wires. Cut new wires to desired length, apply wire tags, strip wire ends, lug wires and install. Test using Engine Simulator Tester. Package and ship to NSWCCD Philadelphia.

i. Refurbish Model 9130 Local Operating Control Panel (LOCOP). Record wire tag information from original wiring. Remove original wiring. Manufacture wire tags for each end of wires. Cut new wires to desired length, apply wire tags, strip wire ends, lug wires and install. Test using Engine Simulator Tester. Package and ship to NSWCCD Philadelphia.

3. In support of the requirements specified under paragraphs 2. a. through i. above, the contractor shall utilize Personnel, meeting the following minimum requirements:

Machinist:

Able to set-up and operate those machines, tools and equipment and make precise alignment and complex set-ups of the work pieces on those drawings listed under paragraph 1.d. 1 through 9 above. Able to work from blueprints and specifications of in-process and finished piece parts. Utilizes shop mathematics to make necessary calculations.

Welder:

The contractor must have available services of a qualified welder in accordance with NAVSEA Publication S9074-AQ-GIB-010/248. Contractor is also required to have written and approved welding procedures in accordance with NAVSEA S9074-AR-GIB-010/278. All welding will require approved non-destructive test procedures in accordance with NAVSEA T9074-AS-GIB-010/271 and MIL-STD-2035 Rev A.

Mechanic (Limited):

Performs trade, craft and manual duties that are of a level between helper and journeymen mechanics. Limited mechanics require the performance of less skilled tasks in the trade under general supervision, coupled with the performance of higher skilled tasks under close supervision. Tasks typically include repair, maintenance, fabrication and assembly for which the job layout, work sequences and material requirements have been previously determined by a higher-level employee. Such duties require familiarity and skill in the use of tools, equipment, machines of the trade, but the employee is given detailed instruction and close guidance when new or unusual tasks are assigned.

Electrical Test Mechanic:

Work requires an intense knowledge of electrical principles and rules as used in shipboard installations. The knowledge of Underwriters Laboratory rules and codes is required. Specialized experience in DELTA P and 24VDC systems. This experience is required through apprenticeships or its equivalent. Disassembles, repairs and rebuilds equipment, tests repairs and realigns parts as necessary. Adjusts and sets various controls and set points to determine proper operation of equipment.

Electronic Test Mechanic:

Work requires broad trade knowledge of electronic theory such as Ohm's Law and the familiarity of resistance scales to ascertain resistance values rapidly. Expert troubleshooting skills on complex equipment used to operate

Marine Gas Turbines. This experience is required through apprenticeships or its equivalent. Disassembles, repairs and rebuilds equipment. Tests repairs and realigns parts as necessary. Adjusts and sets various controls and set points to determine proper operation of equipment.

Test Mechanic:

Work requires broad trade knowledge of mechanical principles, hydraulics, machining of metals and trade mathematics. Specialized experience is required through apprenticeship or its equivalent, i.e., machinery. Disassembles, repairs, and rebuilds machinery, tests repairs and realign parts as necessary. Adjusts and sets various controls. Performs machining of parts and makes test operations of machinery.

4. In addition to the above personnel, the contractor shall utilize and expend the services of a **Packer / Shipper** for each delivery order requiring such. Packaging / Shipping shall be in accordance with the requirements contained under the Packaging / Marking section contained herein.

5. The contractor shall expend the following **Support costs** under any resulting delivery order such:

a. Unless otherwise specified the contractor shall furnish all materials, including raw material required for performance of the services. Each delivery order shall explicitly describe any / all **Government Furnished Material** to be provided to the contractor in support of the tasking requirements identified under such order. The costs for customer furnished material shall be included in the price for each individual line item.

b. The contractor's costs for pick-up / delivery of items in conjunction with the tasks performed under any such delivery order shall be included in the price for each individual line item.

6. Reporting Requirements

a. The reports to be delivered (for the contract and any resulting delivery order) shall be furnished as required by the applicable DD Form 1423, Contract Data Requirements List.

b. Contractor Progress / Status Report – as specified under the DD1423 of this contract, shall be provided on a monthly basis at the end of each month, and shall include information detailing a listing of all delivery orders, current status of tasking requirements, percentage of work completed / remaining and items delivered for each order.

7. Control of Government Furnished Material (GFM)

a. The Government will provide items to be machined//welded, refurbished / restored, assembled / tested by the contractor. Such items shall be identified as **Government Furnished Material (GFM)**, and shall be specified under each delivery order.

b. Government Furnished Material shall be picked up by the contractor at the **NSWCCD, Machinery and Electrical ISE Support Section, Bldg. 1000, 5101 S. 18th Street, Philadelphia, PA 19112**, at such time as specified in each delivery order.

c. Material received from NSWCCD Philadelphia will be received accompanied by NAVSEA Form 4205/19 Government Furnished Equipment.

d. NSWCCD Philadelphia will be responsible for completing Government Furnished Equipment upon issue of the material.

e. Upon receipt of material, contractor will inventory material and return two (2) copies of the completed form to NSWCCD Philadelphia, Code 9332.

- f. Material traceability must be maintained at all times from material to the Government Furnished Equipment Form.
- g. Excess material or spoilage is to be returned to the government.
- h. Government Furnished Material shall be returned in good and usable condition. If repairs are required, the cost of repairs shall be charged to the contractor.
- g. Special requirements identified in Delivery Orders.

8. Quality Assurance Requirements - Contractor's Quality/Inspection System:

The contractor shall provide and maintain a written inspection system, which will assure that all supplies submitted to the Government for acceptance conform to contract requirements for equipment processed by the contractor. The contractor shall perform or have performed the inspections and tests required to substantiate product conformance to drawing, specifications and contract requirements and shall also perform or have performed all inspections and tests otherwise required by the contract. The contractor's inspection system shall be documented and shall be available for review by the Naval Surface Warfare Center Carderock Division – Philadelphia Site, Naval Business Center, Bldg 1000, Philadelphia, PA 19112, Attn. Code 9332 by the Contracting Officer's Representative (COR), fifteen (15) days after award of contract and throughout the life of the contract. The contractor shall notify the Naval Surface Warfare Center Carderock Division – Philadelphia Site in writing of any change to the inspection system. The inspection system shall be subject to disapproval if changes thereto would result in nonconforming product. Vendors currently operating under ANSI/ISO/ASQ Q9001-2000 or MIL-I-45208 quality system will be deemed acceptable under this provision.